CLAIMS

I claim:

1. A method of evaporating cooling fluids in a turbine engine, comprising:

spraying a cooling fluid from at least one fluid emitting device into a duct, whereby a plurality of droplets is formed;

applying an electrical charge to the plurality of droplets forming charged droplets; and

directing the plurality of charged droplets through the duct upstream of a compressor of a turbine engine whereby substantially all of the plurality of charged droplets are evaporated before reaching the compressor.

2. The method of claim 1, further comprising applying an electrical charge to the duct, whereby the electrical charge applied to the duct has a polarity that is opposite to a polarity of the charge applied to the plurality of droplets.

3. The method of claim 1, further comprising applying an electrical charge to the duct, whereby the electrical charge applied to the duct has a polarity that is equal to a polarity of the charge applied to the plurality of droplets.

4. The method of claim 1, further comprising applying an electrical charge to at least one baffle positioned downstream from the at least one fluid emitting device.

5. The method of claim 4, wherein applying an electrical charge to at least one baffle comprises applying an electrical charge having a polarity that is opposite to a polarity of the electrical charge applied to the plurality of droplets if a residence time of the cooling fluids in the duct is not sufficient for a substantial portion of the plurality of droplets emitted into the duct to be evaporated before reaching the compressor of the turbine engine.

6. The method of claim 4, wherein applying an electrical charge to at least one baffle comprises applying an electrical charge having a polarity that is equal to a polarity the electrical charge applied to the plurality of droplets if a residence time of the cooling fluids in the duct is sufficient for a substantial portion of the plurality of droplets emitted into the duct to be evaporated before reaching the compressor of the turbine engine.

7. A turbine engine, comprising:

a compressor having a plurality of turbine blades coupled to a rotatable disc;

at least one duct coupled to the compressor for directing air into the compressor;

at least one fluid emitting device for spraying a cooling fluid into the at least one duct, whereby a plurality of droplets are formed; and

at least one electrode positioned in the duct for applying an electrical charge to at least a portion of the plurality of droplets.

8. The turbine engine of claim 7, further comprising at least one baffle positioned in the at least one duct downstream of the at least one fluid emitting device and upstream of the compressor.

9. The turbine engine of claim 8, further comprising at least one electrode coupled to the at least one baffle for applying an electrical charge to the at least one baffle.

10. The turbine engine of claim 7, further comprising at least one electrode coupled to the duct for applying an electrical charge to the duct.

11. The turbine engine of claim 7, wherein the at least one device for spraying a cooling fluid into the at least one duct comprises at least one nozzle adapted to emit droplets having a Dv90 measurement less than about 50 microns.

12. The turbine engine of claim 11, wherein the at least one device for spraying a cooling fluid into the at least one duct comprises at least one nozzle adapted to emit droplets having a Dv90 measurement less than about 20 microns.

13. The turbine engine of claim 7, wherein the duct is grounded.

14. An evaporative cooling system for a turbine engine, comprising:

at least one duct for directing air into a compressor of a turbine engine;

at least one fluid emitting device for spraying a cooling fluid into the at least one duct, whereby a plurality of droplets are formed;

at least one electrode positioned in the duct for applying an electrical charge to at least a portion of the plurality of droplets.

15. The evaporative cooling system of claim 14, further comprising at least one electrode coupled to the duct for applying an electrical charge to the duct.

16. The evaporative cooling system of claim 14, wherein the at least one fluid emitting device for spraying a cooling fluid into the at least one duct comprises at least one nozzle adapted to emit droplets having a Dv90 measurement less than about 50 microns.

17. The evaporative cooling system of claim 14, further comprising at least one baffle positioned in the at least one duct downstream of the at least one fluid emitting device and upstream of the compressor.

18. The evaporative cooling system of claim 17, further comprising at least one electrode coupled to the at least one baffle for applying an electrical charge to the at least one baffle.

19. The evaporative cooling system of claim 14, wherein the duct is grounded.